Notice No. 4

Rules and Regulations for the Classification of Special Service Craft, July 2015

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Issue date: January 2016

Amendments to	Effective date
Part 16, Chapter 2, Section 11	1 January 2016

Lloyd's Register

Part 16, Chapter 2
Electrical Engineering

Effective date 1 January 2016

■ *Section 11*
Electric cables, optical fibre cables and busbar trunking systems (busways)

11.5 Construction

11.5.3 Where electric and optical fibre cables are required to be of a `fire resistant type', they are in addition to be easily distinguishable and comply with the performance requirements of the appropriate part of IEC 60331: *Tests for electric cables under fire conditions – Circuit integrity*, when tested with a minimum flame application time of 90 minutes, as follows:

- IEC 60331-1:*Tests for electric cables under fire conditions – Circuit integrity – Part 1: Test method for fire with shock at a temperature of at least ~~830°C~~ 830 degrees C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter exceeding 20 mm;*
- IEC 60331-2: *Tests for electric cables under fire conditions – Circuit integrity – Part 2: Test method for fire with shock at a temperature of at least 830 Degrees C for cables of rated voltage up to and including 0,6/1,0 kV and with an overall diameter not exceeding 20 mm;*
- IEC 60331-21: *Tests for electric cables under fire conditions – Circuit integrity – Part 21: Procedures and requirements – Cables of rated voltage up to and including 0,6/1,0 kV*;
- IEC 60331-23: *Tests for electric cables under fire conditions – Circuit integrity – Part 23: Procedures and requirements – Electric data cables*; or
- IEC 60331-25: *Tests for electric cables under fire conditions – Circuit integrity – Part 25: Procedures and requirements – Optical fibre cables*.

Table 2.11.2: Maximum rated conductor temperature

Type of insulating compound	Maximum rated conductor temperature, °C		
	Abbreviated designation	Normal operation	Short-circuit
~~**Thermoplastics:**~~			
~~• Based upon polyvinyl chloride or co-polymer of vinyl chloride and vinyl acetate~~		~~70~~	~~150~~
Elastomeric or thermosetting:			
• Ethylene-propylene rubber or similar (EPM or EPDM)	EPR	90	250
• High modulus or hard grade ethylene propylene rubber	HEPR	90	250
• Cross-linked polyethylene	XLPE	90	250
~~• Ethylene-propylene rubber or similar (EPM or EPDM) halogen free~~		~~90~~	~~250~~
~~• High modulus or hard grade halogen-free ethylene propylene rubber~~		~~90~~	~~250~~
~~• Halogen-free cross-linked polyethylene~~		~~90~~	~~250~~
• Cross-linked polyolefin material for halogen-free cables	HF90	90	250
• Silicone rubber	S95	95	350
~~• Halogen-free silicone rubber~~		~~95~~	~~350~~

11.6 Conductor size

Table 2.11.3: Electric cable current ratings, normal operation, based on ambient 45°C

Nominal cross-section (mm^2)	Continuous r.m.s. current rating, in amperes								
	~~Thermoplastic, (70°C)~~			Elastomeric (90°C)			Elastomeric or thermosetting, based on silicon rubber (95°C)		
	~~Single Core~~	~~2 core~~	~~3 or 4 core~~	Single Core	2 core	3 or 4 core	Single Core	2 core	3 or 4 core
0,75	~~10~~	~~8~~	~~7~~	15	13	11	17	14	12
1	~~12~~	~~10~~	~~8~~	18	15	13	20	17	14
1,25	~~13~~	~~11~~	~~9~~	21	18	14	23	20	16
1,5	~~15~~	~~13~~	~~11~~	23	20	16	26	22	18
2	~~18~~	~~15~~	~~12~~	28	24	19	31	26	22
2,5	~~21~~	~~18~~	~~15~~	30	26	21	32	27	22
3,5	~~26~~	~~22~~	~~18~~	37	32	26	39	33	28
4	~~29~~	~~25~~	~~20~~	40	34	28	43	37	30
5,5	~~35~~	~~30~~	~~24~~	49	42	35	52	44	37
6	~~37~~	~~31~~	~~26~~	52	44	36	55	47	39
8	~~44~~	~~37~~	~~31~~	62	53	44	66	56	46
10	~~51~~	~~43~~	~~36~~	72	61	50	76	65	53
14	~~62~~	~~53~~	~~44~~	88	75	62	94	80	66
16	~~68~~	~~58~~	~~48~~	96	82	67	102	87	71
22	~~83~~	~~70~~	~~58~~	117	100	82	124	106	87
25	~~90~~	~~77~~	~~63~~	127	108	89	135	115	95
30	~~101~~	~~85~~	~~70~~	142	121	100	151	128	106
35	~~111~~	~~94~~	~~78~~	157	133	110	166	141	116
38	~~117~~	~~99~~	~~82~~	165	140	116	175	149	122
50	~~138~~	~~117~~	~~97~~	196	167	137	208	177	146
60	~~155~~	~~132~~	~~109~~	220	187	154	233	198	163
70	~~171~~	~~145~~	~~120~~	242	206	169	256	218	179
80	~~186~~	~~158~~	~~130~~	263	224	184	278	237	195
95	~~207~~	~~176~~	~~145~~	293	249	205	310	264	217
100	~~213~~	~~181~~	~~149~~	302	257	212	320	272	224
120	~~239~~	~~203~~	~~167~~	339	288	237	359	305	251
125	~~245~~	~~209~~	~~172~~	348	295	243	368	313	258
150	~~275~~	~~234~~	~~193~~	389	331	272	412	350	288
185	~~313~~	~~266~~	~~219~~	444	377	311	470	400	329
200	~~329~~	~~280~~	~~230~~	466	396	326	494	420	346
240	~~369~~	~~314~~	~~258~~	522	444	365	553	470	387
300	~~424~~	~~360~~	~~297~~	601	511	421	636	541	445

Table 2.11.4: Electric cable current ratings, r.m.s. short-circuit current

Nominal cross-section (mm^2)	~~Fault current (kA) at 150°C~~			Fault current (kA) at 250°C			Fault current (kA) at 350°C		
	~~1 s duration~~	~~0,5 s duration~~	~~0,1 s duration~~	1 s duration	0,5 s duration	0,1 s duration	1 s duration	0,5 s duration	0,1 s duration
0,75	~~0,1~~	~~0,1~~	~~0,3~~	0,1	0,2	0,3	0,1	0,2	0,4
1	~~0,1~~	~~0,2~~	~~0,3~~	0,1	0,2	0,5	0,2	0,2	0,5
1,25	~~0,1~~	~~0,2~~	~~0,4~~	0,2	0,3	0,6	0,2	0,3	0,7
1,5	~~0,2~~	~~0,2~~	~~0,5~~	0,2	0,3	0,7	0,3	0,4	0,8
2	~~0,2~~	~~0,3~~	~~0,7~~	0,3	0,4	0,9	0,3	0,5	1,1
2,5	~~0,3~~	~~0,4~~	~~0,9~~	0,4	0,5	1,1	0,4	0,6	1,4
3,5	~~0,4~~	~~0,5~~	~~1,2~~	0,5	0,7	1,6	0,6	0,8	1,9
4	~~0,4~~	~~0,6~~	~~1,4~~	0,6	0,8	1,8	0,7	1,0	2,2
5,5	~~0,6~~	~~0,8~~	~~1,9~~	0,8	1,1	2,5	0,9	1,3	3,0
6	~~0,7~~	~~0,9~~	~~2,1~~	0,9	1,2	2,7	1,0	1,5	3,2
8	~~0,9~~	~~1,2~~	~~2,8~~	1,1	1,6	3,6	1,4	1,9	4,3
10	~~1,1~~	~~1,5~~	~~3,5~~	1,4	2,0	4,5	1,7	2,4	5,4
14	~~1,5~~	~~2,2~~	~~4,8~~	2,0	2,8	6,3	2,4	3,4	7,6
16	~~1,7~~	~~2,5~~	~~5,5~~	2,3	3,2	7,2	2,7	3,9	8,7
22	~~2,4~~	~~3,4~~	~~7,6~~	3,1	4,5	10,0	3,8	5,3	11,9
25	~~2,7~~	~~3,9~~	~~8,6~~	3,6	5,1	11,3	4,3	6,0	13,5
30	~~3,3~~	~~4,6~~	~~10,4~~	4,3	6,1	13,6	5,1	7,3	16,2
35	~~3,8~~	~~5,4~~	~~12,1~~	5,0	7,1	15,8	6,0	8,5	18,9
38	~~4,1~~	~~5,9~~	~~13,1~~	5,4	7,7	17,2	6,5	9,2	20,6
50	~~5,5~~	~~7,7~~	~~17,3~~	7,2	10,1	22,6	8,6	12,1	27,1
60	~~6,5~~	~~9,3~~	~~20,7~~	8,6	12,1	27,1	10,3	14,5	32,5
70	~~7,6~~	~~10,8~~	~~24,2~~	10,0	14,2	31,7	12,0	16,9	37,9
80	~~8,7~~	~~12,3~~	~~37,6~~	11,4	16,2	36,2	13,7	19,4	43,3
95	~~10,4~~	~~14,7~~	~~32,8~~	13,6	19,2	43,0	16,3	23,0	51,4
100	~~10,9~~	~~15,4~~	~~34,5~~	14,3	20,2	45,2	17,1	24,2	54,1
120	~~13,1~~	~~18,5~~	~~41,4~~	17,2	24,3	54,3	20,5	29,0	64,9
125	~~13,6~~	~~19,3~~	~~43,1~~	17,9	25,3	56,6	21,4	30,2	67,6
150	~~16,4~~	~~23,2~~	~~51,8~~	21,5	30,4	67,9	25,7	36,3	81,2
185	~~20,2~~	~~28,6~~	~~63,9~~	26,5	37,4	83,7	31,7	44,8	100,1
200	~~21,8~~	~~30,9~~	~~69,0~~	28,6	40,5	90,5	34,2	48,4	108,2
240	~~26,2~~	~~37,0~~	~~82,8~~	34,3	48,6	108,6	41,1	58,1	129,9
300	~~32,7~~	~~46,3~~	~~103,6~~	42,9	60,7	135,7	51,3	72,6	162,3

Table 2.11.5: Correction factors

Insulation material	Correction factor for ambient air temperature of °C										
	35	40	45	50	55	60	65	70	75	80	85
~~Thermoplastic (70°C)~~	~~1,18~~	~~1,10~~	~~1,00~~	~~0,89~~	~~0,77~~	~~0,63~~	~~—~~	~~—~~	~~—~~	~~—~~	~~—~~
Elastomeric or thermosetting (90°C)	1,10	1,05	1,00	0,94	0,88	0,82	0,74	0,67	0,58	0,47	—
Elastomeric or thermosetting, based on silicone rubber (95°C)	1,10	1,05	1,00	0,95	0,89	0,84	0,77	0,71	0,63	0,55	0,45

Table 2.11.6: Minimum internal radii of bends in cables for fixed wiring

Cable construction		Overall diameter of cable	Minimum internal radius of bend (times overall diameter of cable)
Insulation	Outer covering		
~~Thermoplastic and e~~Elastomeric 600/1000 V and below	Metal sheathed Armoured and braided	Any	6*D*
	Other finishes	≤ 25 mm > 25 mm	4*D* 6*D*
Mineral	Hard metal sheathed	Any	6*D*
~~Thermoplastic and e~~Elastomeric above 600/1000 V			
– single core	Any	Any	12*D*
– multicore	Any	Any	9*D*

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